PATENT COOPERATION TREATY

10/049462

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 29 July 2002 (29.07.02)	
International application No. PCT/EP00/07675	**Applicant's or agent's file reference** MSP587
International filing date (day/month/year) 03 August 2000 (03.08.00)	**Priority date** (day/month/year) 13 August 1999 (13.08.99)
Applicant JAMES, Stephen et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

25 February 2002 (25.02.02)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [ ] was

[X] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer
Zakaria EL KHODARY

Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

PCT

To:
DOW CORNING LIMITED
Attn. DAVIES, Peter V.
Cardiff Road
Barry CF63 2YL
UNITED KINGDOM

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference MSP587	Date of mailing *(day/month/year)* 14/11/2000
International application No. PCT/EP 00/ 07675	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
Applicant DOW CORNING CORPORATION	International filing date *(day/month/year)* 03/08/2000

1. [X] The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Fascimile No.: (41–22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. [ ] The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. [ ] **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

[ ] the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

[ ] no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone th entry into the national phase until 30 months from th priority date (in some Offices even later).

Within **20 m nths** from th priority date, th applicant must perform the prescribed acts for entry into th national phase before all designated Offices which have not been elected in the demand or in a later lection within 19 months from the priority dat or could not be lected because th y are not bound by Chapter II.

Name and mailing address of the International Searching Authority European Patent Office, P.B. 5818 Patentlaan 2 NL–2280 HV Rijswijk T l. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Authorized officer Alfredo Prein

Form PCT/ISA/220 (July 1998)

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped),whether

(i) the claim is unchanged;

(ii) the claim is cancelled;

(iii) the claim is new;

(iv) the claim replaces one or more claims as filed;

(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international appplication is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

PATENT OPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION see Notification of Transmittal of International Search R port (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
MSP587		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP 00/ 07675	03/08/2000	13/08/1999
Applicant		
DOW CORNING CORPORATION		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in th international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

   [X] the text is approved as submitted by the applicant.

   [ ] th text has been established, according to Rul 38.2(b), by this Authority as it appears in Box III. The applicant may, within on month from th date of mailing of this international search report, submit comm nts to this Authority.

6. The figure of the **drawing** to be published with the abstract is Figure No. ---

   [ ] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characteriz s the invention.

   [ ] Non of th figures.

na

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
MSP587		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/EP 00/ 07675	03/08/2000	13/08/1999
Applicant		
DOW CORNING CORPORATION		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. ---

   [ ] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* MSP587

Box No. I TITLE OF INVENTION

COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

Box No. II APPLICANT

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

DOW CORNING CORPORATION
MIDLAND
MICHIGAN, 48611
USA

☐ This person is also inventor.

Telephone No.
001 517 496 6067

Facsimile No.
001 517 496 6354

Teleprinter No.

State *(that is, country)* of nationality:
US

State *(that is, country)* of residence:
US

This person is applicant for the purposes of:
☐ all designated States
☒ all designated States except the United States of America
☐ the United States of America only
☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

JAMES, STEPHEN

53 FONMON PARK ROAD
RHOOSE
VALE OF GLAMORGAN, CF62 3BG
UK

This person is:
☐ applicant only
☒ applicant and inventor
☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:
UK

State *(that is, country)* of residence:
UK

This person is applicant for the purposes of:
☐ all designated States
☐ all designated States except the United States of America
☒ the United States of America only
☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:
☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

DAVIES, PETER V., VANDAMME, LUC J., WILLIAMS, PAUL E.,
DONLAN, ANDREW M.
DOW CONRING LIMITED
CARDIFF ROAD
BARRY
CF63 2YL
UK

Telephone No.
(44) 1446 723505

Facsimile No.
(44) 1446 749672

Teleprinter No.

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Sheet No. 2

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

LAWSON, DAVID

3 ST MARGARET'S PLACE
WHITCHURCH
CARDIFF
CF14 7AD
UK

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: UK

State *(that is, country)* of residence: UK

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

VAN DER VEEN, MELANIE

18 GRON FFORD
RHIWBINA
CARDIFF
CF14 6SJ
UK

This person is:
- ☐ applicant only
- ☒ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality: UK

State *(that is, country)* of residence: UK

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

This person is:
- ☐ applicant only
- ☐ applicant and inventor
- ☐ inventor only *(If this check-box is marked, do not fill in below.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) *(mark the applicable check-boxes; at least one must be marked)*:

Regional Patent

☒ **AP** **ARIPO Patent:** **GH** Ghana, **GM** Gambia, **KE** Kenya, **LS** Lesotho, **MW** Malawi, **SD** Sudan, **SL** Sierra Leone, **SZ** Swaziland, **TZ** United Republic of Tanzania, **UG** Uganda, **ZW** Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT

☒ **EA** **Eurasian Patent:** **AM** Armenia, **AZ** Azerbaijan, **BY** Belarus, **KG** Kyrgyzstan, **KZ** Kazakhstan, **MD** Republic of Moldova, **RU** Russian Federation, **TJ** Tajikistan, **TM** Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT

☒ **EP** **European Patent:** **AT** Austria, **BE** Belgium, **CH and LI** Switzerland and Liechtenstein, **CY** Cyprus, **DE** Germany, **DK** Denmark, **ES** Spain, **FI** Finland, **FR** France, **GB** United Kingdom, **GR** Greece, **IE** Ireland, **IT** Italy, **LU** Luxembourg, **MC** Monaco, **NL** Netherlands, **PT** Portugal, **SE** Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT

☒ **OA** **OAPI Patent:** **BF** Burkina Faso, **BJ** Benin, **CF** Central African Republic, **CG** Congo, **CI** Côte d'Ivoire, **CM** Cameroon, **GA** Gabon, **GN** Guinea, **GW** Guinea-Bissau, **ML** Mali, **MR** Mauritania, **NE** Niger, **SN** Senegal, **TD** Chad, **TG** Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)* .....

National Patent *(if other kind of protection or treatment desired, specify on dotted line)*:

☒ **AE** United Arab Emirates
☒ **AL** Albania .....
☒ **AM** Armenia .....
☒ **AT** Austria .....
☒ **AU** Australia .....
☒ **AZ** Azerbaijan
☒ **BA** Bosnia and Herzegovina .....
☒ **BB** Barbados
☒ **BG** Bulgaria .....
☒ **BR** Brazil .....
☒ **BY** Belarus .....
☒ **CA** Canada
☒ **CH and LI** Switzerland and Liechtenstein
☒ **CN** China .....
☒ **CR** Costa Rica .....
☒ **CU** Cuba .....
☒ **CZ** Czech Republic .....
☒ **DE** Germany .....
☒ **DK** Denmark .....
☒ **DM** Dominica
☒ **EE** Estonia .....
☒ **ES** Spain .....
☒ **FI** Finland .....
☒ **GB** United Kingdom
☒ **GD** Grenada
☒ **GE** Georgia .....
☒ **GH** Ghana .....
☒ **GM** Gambia
☒ **HR** Croatia .....
☒ **HU** Hungary .....
☒ **ID** Indonesia
☒ **IL** Israel .....
☒ **IN** India .....
☒ **IS** Iceland
☒ **JP** Japan .....
☒ **KE** Kenya .....
☒ **KG** Kyrgyzstan .....
☒ **KP** Democratic People's Republic of Korea .....
☒ **KR** Republic of Korea .....
☒ **KZ** Kazakhstan .....
☒ **LC** Saint Lucia
☒ **LK** Sri Lanka
☒ **LR** Liberia
☒ **LS** Lesotho .....
☒ **LT** Lithuania
☒ **LU** Luxembourg
☒ **LV** Latvia
☒ **MA** Morocco .....
☒ **MD** Republic of Moldova .....
☒ **MG** Madagascar .....
☒ **MK** The former Yugoslav Republic of Macedonia .....
☒ **MN** Mongolia
☒ **MW** Malawi .....
☒ **MX** Mexico .....
☒ **NO** Norway
☒ **NZ** New Zealand .....
☒ **PL** Poland .....
☒ **PT** Portugal .....
☒ **RO** Romania
☒ **RU** Russian Federation .....
☒ **SD** Sudan
☒ **SE** Sweden
☒ **SG** Singapore
☒ **SI** Slovenia .....
☒ **SK** Slovakia .....
☒ **SL** Sierra Leone .....
☒ **TJ** Tajikistan .....
☒ **TM** Turkmenistan .....
☒ **TR** Turkey .....
☒ **TT** Trinidad and Tobago .....
☒ **TZ** United Republic of Tanzania
☒ **UA** Ukraine .....
☒ **UG** Uganda .....
☒ **US** United States of America .....
☒ **UZ** Uzbekistan .....
☒ **VN** Viet Nam .....
☒ **YU** Yugoslavia .....
☒ **ZA** South Africa .....
☒ **ZW** Zimbabwe .....

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

☐ .....
☐ .....

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)*

Box No. VI PRIORITY CLAIM ☐ Further priority claims are indicated in the Supplemental Box.

Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is: national application: country	regional application:* regional Office	international application: receiving Office
item (1) 13 AUG 1999	9919074.6	GB		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office)* identified above as item(s):

** Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.*

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used)* :

ISA / EP

Request to use results of earlier search; reference to that search *(if an earlier search has been carried out by or requested from the International Searching Authority):*

Date *(day/month/year)* Number Country *(or regional Office)*

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following **number of sheets**:

request	: 4
description (excluding sequence listing part)	: 16
claims	: 4
abstract	: 1
drawings	:
sequence listing part of description	:
Total number of sheets	: 25

This international application is **accompanied by** the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☒ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☒ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☐ other *(specify)*:

Figure of the drawings which should accompany the abstract:

Language of filing of the international application: ENGLISH

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Peter Davies

For receiving Office use only

1. Date of actual receipt of the purported international application:
2. Drawings: ☐ received: ☐ not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:
4. Date of timely receipt of the required corrections under PCT Article 11(2):
5. International Searching Authority (if two or more are competent): ISA /
6. ☐ Transmittal of search copy delayed until search fee is paid.

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

This sheet is not part of and does not count as a sheet of the international application.

PCT

FEE CALCULATION SHEET
Annex to the Request

For receiving Office use only

International application No.

Date stamp of the receiving Office

Applicant's or agent's file reference MSP587

Applicant
DOW CORNING CORPORATION

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE . . . . . 199.49 T

2. SEARCH FEE . . . . . 1848.26 S

International search to be carried out by _____

(If two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

The international application contains 25 sheets.

first 30 sheets 799.93 b1

x _____ = b2
remaining sheets additional amount

Add amounts entered at b1 and b2 and enter total at B . . . . 799.93 B

Designation Fees

The international application contains 83 designations.

8 x 172.11 = 1376.88 D
number of designation fees payable *(maximum 8)* amount of designation fee

Add amounts entered at B and D and enter total at I . . . . . 2176.81 I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT *(if applicable)* . . . . . P

5. TOTAL FEES PAYABLE . . . . . DEM 4224.56 TOTAL
Add amounts entered at T, S, I and P, and enter total in the TOTAL box

☐ The designation fees are not paid at this time.

MODE OF PAYMENT

☒ authorization to charge deposit account (see below)	☐ bank draft	☐ coupons
☐ cheque	☐ cash	☐ other *(specify)*:
☐ postal money order	☐ revenue stamps	

DEPOSIT ACCOUNT AUTHORIZATION *(this mode of payment may not be available at all receiving Offices)*

The RO/ EP

☒ is hereby authorized to charge the total fees indicated above to my deposit account.

☒ *(this check-box may be marked only if the conditions for deposit accounts of the receiving Office so permit)* is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

☐ is hereby authorized to charge the fee for preparation and transmittal of the priority document to the International Bureau of WIPO to my deposit account.

28050147	31 July 2000	Chris Dams
Deposit Account No.	Date *(day/month/year)*	Signature

PCT

POWER OF ATTORNEY

(for an international application filed under the Patent Cooperation Treaty)

(PCT Rule 90.4)

The undersigned applicant(s) *(Names should be indicated as they appear in the request)*:

LAWSON, DAVID

3 ST MARGARET'S PLACE
WHITCHURCH
CARDIFF
CF14 7AD
UK

hereby appoints (appoint) the following person as: ☒ agent ☐ common representative

Name and address
(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

DAVIES, PETER V., VANDAMME, LUC J., WILLIAMS, PAUL E., DONLAN, ANDREW M.

DOW CORNING LIMITED
CARDIFF ROAD
BARRY
CF63 2YL
UK

to represent the undersigned before

☒ all the competent International Authorities
☐ the International Searching Authority only
☐ the International Preliminary Examining Authority only

in connection with the international application identified below:

Title of the invention: COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

Applicant's or agent's file reference: MSP587

International application number (if already available):

filed with the following Office EUROPEAN PATENT OFFICE as receiving Office
and to make or receive payments on behalf of the undersigned.

Signature of the applicant(s) *(where there are several applicants, each of them must sign; next to each signature, indicate the name of the person signing and the capacity in which the person signs, if such capacity is not obvious from reading the request or this power)*:

D.W. Lawson

DAVID LAWSON

Date: 27th July 2000

Form PCT/Model of power of attorney (for a given international application) (July 1992)

PCT

POWER OF ATTORNEY

(for an international application filed under the Patent Cooperation Treaty)

(PCT Rule 90.4)

The undersigned applicant(s) *(Names should be indicated as they appear in the request)*:

VAN DER VEEN, MELANIE

18 GRON FFORD
RHIWBINA
CARDIFF
CF14 6SJ
UK

hereby appoints (appoint) the following person as: ☒ agent ☐ common representative

Name and address

(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

DAVIES, PETER V., VANDAMME, LUC J., WILLIAMS, PAUL E., DONLAN, ANDREW M.

DOW CORNING LIMITED
CARDIFF ROAD
BARRY
CF63 2YL
UK

to represent the undersigned before

☒ all the competent International Authorities

☐ the International Searching Authority only

☐ the International Preliminary Examining Authority only

in connection with the international application identified below:

Title of the invention: COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

Applicant's or agent's file reference: MSP587

International application number (if already available):

filed with the following Office EUROPEAN PATENT OFFICE as receiving Office
and to make or receive payments on behalf of the undersigned.

Signature of the applicant(s) *(where there are several applicants, each of them must sign; next to each signature, indicate the name of the person signing and the capacity in which the person signs, if such capacity is not obvious from reading the request or this power)*:

MVanderVeen

MELANIE VAN DER VEEN

Date: 27th July 2000

PCT

POWER OF ATTORNEY

(for an international application filed under the Patent Cooperation Treaty)

(PCT Rule 90.4)

The undersigned applicant(s) *(Names should be indicated as they appear in the request)*:

JAMES, STEPHEN

53 FONMON PARK ROAD
RHOOSE
VALE OF GLAMORGAN
CF62 3BG
UK

hereby appoints (appoint) the following person as: ☒ agent ☐ common representative

Name and address

(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

DAVIES, PETER V., VANDAMME, LUC J., WILLIAMS, PAUL E., DONLAN, ANDREW M.

DOW CORNING LIMITED
CARDIFF ROAD
BARRY
CF63 2YL
UK

to represent the undersigned before

☒ all the competent International Authorities

☐ the International Searching Authority only

☐ the International Preliminary Examining Authority only

in connection with the international application identified below:

Title of the invention: COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

Applicant's or agent's file reference: MSP587

International application number (if already available):

filed with the following Office EUROPEAN PATENT OFFICE as receiving Office and to make or receive payments on behalf of the undersigned.

Signature of the applicant(s) *(where there are several applicants, each of them must sign; next to each signature, indicate the name of the person signing and the capacity in which the person signs, if such capacity is not obvious from reading the request or this power)*:

S James

STEPHEN JAMES

Date: 27th July 2000.

Form PCT/Model of power of attorney (for a given international application) (July 1992)

PCT

GENERAL POWER OF ATTORNEY

(for several international applications filed under the Patent Cooperation Treaty)

(PCT Rule 90.5)

The undersigned person(s):
(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

DOW CORNING CORPORATION
MIDLAND
MICHIGAN 48611
USA

hereby appoint(s) the following person as: ☒ agent ☐ common representative

Name and address
(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

VANDAMME, LUC J., WILLIAMS, PAUL E., DAVIES, PETER V., DONLAN ANDREW M

DOW CORNING LIMITED
CARDIFF ROAD
BARRY
CF63 2YL
UK

to represent the undersigned before

☒ all the competent International Authorities
☐ the International Searching Authority only
☐ the International Preliminary Examining Authority only

in connection with any and all international applications filed by the undersigned with the following Office

EUROPEAN PATENT OFFICE

and to make or receive payments on behalf of the undersigned. as receiving Office

Signature(s) *(where there are several persons, each of them must sign; next to each signature, indicate the name of the person signing and the capacity in which the person signs, if such capacity is not obvious from reading this power):*

JAMES R JENKINS
VICE PRESIDENT, CORPORATE SECRETARY AND GENERAL COUNSEL

Date: February 16, 2000

Form PCT/Model of general power of attorney (for several international applications) (July 1992)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
22 February 2001 (22.02.2001)

PCT

(10) International Publication Number
WO 01/12894 A1

(51) International Patent Classification[7]: D06N 3/12, C09D 183/04

(21) International Application Number: PCT/EP00/07675

(22) International Filing Date: 3 August 2000 (03.08.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
9919074.6 13 August 1999 (13.08.1999) GB

(71) Applicant *(for all designated States except US)*: **DOW CORNING CORPORATION** [US/US]; Midland, MI 48611 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **JAMES, Stephen** [GB/GB]; 53 Fonmon Park Road, Rhoose, Vale of Glamorgan CF62 3BG (GB). **LAWSON, David** [GB/GB]; 3 St. Margaret's Place, Whitchurch, Cardiff CF14 7AD (GB). **VAN DER VEEN, Melanie** [GB/GB]; 18 Gron Fford, Rhiwbina, Cardiff CF14 6SJ (GB).

(74) Agents: **DAVIES, Peter, V.** et al.; Dow Corning Limited, Cardiff Road, Barry CF63 2YL (GB).

(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/12894 A1

(54) Title: COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

(57) Abstract: An elastomer-forming coating composition for textile fabrics comprises a first, second and third organopolysiloxane having aliphatically unsaturated substituents, an organosilicon crosslinker having at least 3 silicon-bonded hydrogen atoms, a catalyst and a reinforcing filler. First and second organopolysiloxanes have only terminal aliphatically unsaturated substituents, first having a viscosity at 25 °C of from 50 to 650 mm^2/s, second a viscosity at 25 °C of at least 10,000 mm^2/s and third organopolysiloxane has aliphatically unsaturated substituents at terminal siloxane units and on siloxane units in the siloxane polymer chain. Coated textile fabrics and a process for making them is also claimed. Coated fabrics are especially useful in applications where they form a barrier between areas of differing pressures, e.g. airbags. Resulting coatings combine very good tear strength and elongation at break values.

COATING COMPOSITIONS AND TEXTILE FABRICS COATED THEREWITH

The present invention relates to a coating composition for textile fabrics and to textile fabrics coated with such compositions, and in particular to a fabric coated with a silicone-based coating composition capable of maintaining a pressure barrier between two areas with a pressure differential. The invention also relates to a process of preparing such textile fabrics and to airbags made with coated fabrics.

Coating compositions for textile substrates, which provide a flexible coat on the fabric, e.g. to decrease permeability of the fabric or to improve thermal protection of the fabric are well known in the art, and are described in many patent specifications, such as those referred to below. The present invention is particularly concerned with coating compositions which give a silicone-based elastomeric finish. It is traditionally required to use an adhesion promoter in such compositions to ensure good adhesion to the fabric and to maintain a good shelf life of the coated textile fabric.

EP 553840 describes a liquid silicone rubber coating composition for application to airbags in automobiles, which comprises a polydiorganosiloxane having alkenyl groups, an polyorganosiloxane resin, an inorganic filler, a certain polyorganohydrosiloxane, a platinum group metal catalyst and an epoxy group-containing organosilicon compound. EP 646672 describes a fabric for airbags impregnated with a silicone composition comprising a linear polyorganosiloxane having aliphatic unsaturation, a certain polyorganohydrosiloxane, a catalyst promoting addition reaction, a hydrophobic silica, a flame retardant and optionally an adhesion promoting agent.

While fabrics coated with such compositions may be satisfactory for airbag applications, they do not satisfy requirements where pressurised fluids are to be retained in a fabric envelope for a relatively long period. This requirement exists for example in the application of such coatings to side curtain airbags for the automotive industry. These side curtain airbags are intended to inflate at the time of impact, as do conventional airbags. The side curtains unfold to form a cushioned curtain between passengers and some of the side of the car body, e.g., the windows. As the intention is not merely to cushion the blow on impact itself, as is the case for conventional driver and passenger airbags, but e.g. to protect passengers when a car is rolling, it is important that the side curtain air bag is sufficiently pressurised during such rolling process. Where conventional driver and passenger airbags only need to retain pressure for a fraction of a second, it is desirable that side curtain airbags maintain a suitable pressure for a few seconds. Similar applications exist where a pressurised fabric structure is desired to maintain a certain fluid pressure for a relatively extended period of time, e.g. in emergency chutes for aeroplanes, inflatable rafts etc.

EP 886164 describes a coated fabric comprising a textile fabric coated with at least two layers of an polyorganosiloxane-based elastomeric material, characterised in that the first layer is coated onto the fabric and has an elongation-at-break of at least 400% and in that the second layer has a tear-strength of at least 30kN/m. However the application of 2 coats onto a fabric substrate causes additional work and cost to the manufacturing process and may provide a final coating of fairly high coat weight. There is a need to provide coatings which will perform well in the side curtain applications, but which require only a

single coat and still provide good performance, preferably at lower coat weight.

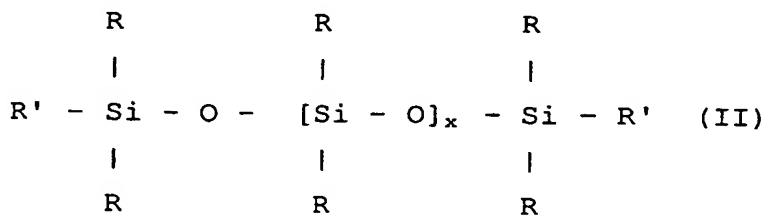
According to a first aspect of the invention, there is provided a coating composition for textile fabrics, which is curable to an elastomeric finish, which comprises a first, second and third organopolysiloxane having aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents, an organosilicon crosslinker having at least 3 silicon-bonded hydrogen atoms, a catalyst able to promote the reaction of the aliphacally unsaturated hydrocarbon or hydrocarbonoxy substituents with Si-H groups and a reinforcing filler, wherein the first and second organopolysiloxanes have aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents only at the terminal siloxane units, the first organopolysiloxane having a viscosity at 25°C of from 50 to 650 mm^2/s, the second organopolysiloxane having a viscosity at 25°C of at least 10,000 mm^2/s and wherein the third organopolysiloxane has aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents at terminal siloxane units and on siloxane units in the siloxane polymer chain.

We have found surprisingly that such coating compositions do not need any adhesion promoters to ensure good adhesion to textile fabrics. We have also found that fabrics coated according to the present invention are beneficial in standard airbags and other inflatable safety restraint devices.

The coating composition comprises organopolysiloxanes which are able to cure to an elastomeric finish via an addition reaction. Useful organopolysiloxanes comprise units of the general formula $R_aR'_bSiO_{4-a-b/2}$ (I), wherein R is a monovalent hydrocarbon group having up to 18 carbon atoms, R' is a monovalent hydrocarbon or hydrocarbonoxy group having aliphatic unsaturation, a and b have a value of from 0 to 3, the sum of a+b being no more than 3, provided the

conditions outlined above for the organopolysiloxane materials are complied with.

Preferably the first and second organosiloxane polymers are of a generally linear nature having the general structure (II)

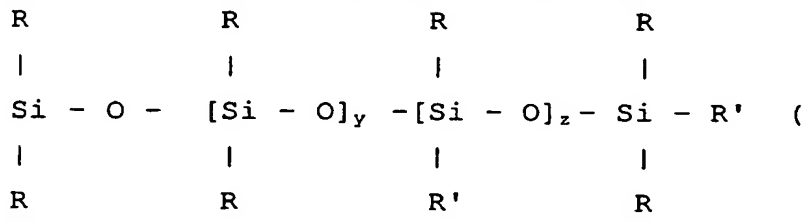


(II)

wherein R and R' have the same meaning as above, and wherein x is an integer to allow the organopolysiloxane to fulfil the requirements for the viscosity range, mentioned above, for example a value of up to 300, preferably from 75 to 250, more preferably 100 to 200 for the first organopolysiloxane and having a value of at least 300, preferably from 400 to 1000, more preferably 450 to 1000 for the second organopolysiloxane. It is particularly preferred that R denotes an alkyl or aryl group having from 1 to 8 carbon atoms, e.g. methyl, ethyl, propyl, isobutyl, hexyl, phenyl or octyl. More preferably at least 50% of all R groups are methyl groups, most preferably substantially all R groups are methyl groups. R' is an aliphatically unsaturated hydrocarbon or hydrocarbonoxy group, preferably a hydrocarbon group having from 2 to 22 carbon atoms, more preferably 2 to 8 carbon atoms, most preferably 2 or 6 carbon atoms. It is particularly preferred that the aliphatically unsaturated group is an alkenyl group, although alkynyl groups may also be used. Particularly useful are vinyl, allyl and hexenyl groups, most preferably having terminal unsaturation. It is most preferred that first organopolysiloxane is an α,ω-vinyldimethylsiloxy polydimethylsiloxane polymer having a viscosity of from 50 to 650 mm^2/s at 25°C, more preferably 100 to 600 mm^2/s, most

preferably 300 to 600 mm^2/s. It is also most preferred that second organopolysiloxane is an α,ω-vinyldimethylsiloxy polydimethylsiloxane polymer having a viscosity of from 10,000 to 90,000 mm^2/s at 25°C, more preferably 20,000 to 80,000 mm^2/s, most preferably 40,000 to 70,000 mm^2/s.

Preferably the third organosiloxane polymer is also of a generally linear nature having the general structure (III)



(III)

wherein R and R' have the same meaning as above, and wherein *y* is zero or an integer and *z* has a value of at least 1. The value of *y+z* is no more than 300, preferably from 100 to 200, more preferably from 120 to 180. The value of *z* is preferably at least 2, more preferably from 2 to 20, most preferably 2 to 5. It is most preferred that third organopolysiloxane is an α,ω-vinyldimethylsiloxy polydimethylsiloxane polymethylvinylsiloxy co-polymer having a viscosity of from 50 to 650 mm^2/s at 25°C, more preferably 100 to 600 mm^2/s, most preferably 300 to 600 mm^2/s.

The relative amounts of first second and third organopolysiloxanes of the first aspect of the invention are not crucial, although it is preferred that the second organopolysiloxane is present in the largest amount. A factor which will influence the exact ratios is the viscosity of each of the organopolysiloxanes and the desired viscosity of the composition needed for coating the textile fabrics. It is preferred that this viscosity is sufficiently low to allow the use of standard coating equipment at normal temperatures. Suitable weight ratios of the first to second organopolysiloxanes are from 1 to 2 to 1

to 20, whilst suitable weight ratios of the second to third organopolysiloxanes are from 20 to 1 to 2 to 1. Particularly suitable weight ratio of first, second and third organopolysiloxanes are 1/2/1, 1/5/1, 2/10/1, 1/10/2, 5/10/1 and 2/5/1. It is preferred that first, second and third organopolysiloxanes combined comprise from 40 to 95% by weight of the elastomer-forming coating composition according to the first aspect of the invention, preferably from 50 to 85%, more preferably 60 to 80%.

Organosilicon cross-linkers for use in the elastomer-forming coating composition according to the invention are preferably selected from silanes, low molecular weight organosilicon resins and short chain organosiloxane polymers. The cross-linker compound has at least 3 silicon-bonded hydrogens which are capable of reacting with the silicon-bonded groups R' of the organopolysiloxane described above by addition reaction between the cross-linking organosilicon compound and the organopolysiloxane, for example according to the general reaction scheme (IV), wherein R" is a divalent hydrocarbon group and y is as defined above, preferably here with a value of 1.

$$\equiv Si\text{-}R"_yCH{=}CH_2 + H\text{-}Si\equiv \rightarrow \equiv Si\text{-}R"_yCH_2\text{-}CH_2\text{-}Si\equiv \quad (IV)$$

A suitable silane which may serve as cross-linking organosilicon compound is methyltrihydrosilane. Suitable organosilicon resin compounds include organosilicon resins consisting mainly of tetrafunctional siloxane units of the formula $SiO_{4/2}$ and monofunctional units $R_vH_wSi_{1/2}$, wherein R is as defined above, v and w each have a value of from 0 to 3, the sum of $v+w$ being 3. Suitable short chain organosiloxane polymers include those having at least 3 silicon-bonded hydrogen atoms per molecule and may be linear or cyclic. Preferred organosilicon cross-linkers have the general formula

$R^3R^4_2SiO(R^4_2SiO)_p(R^4HSiO)_qSiR^4_2R^5$ or

$-(R^4_2SiO)_p-(R^4HSiO)_q-$

wherein R^4 denotes an alkyl or aryl group having up to 10 carbon atoms, R^3 is a group R^4 or a hydrogen atom, p has a value of from 0 to 20, q has a value of from 1 to 70, and there are at least 3 silicon-bonded hydrogen atoms present per molecule. It is not crucial but preferred that the silicon-bonded hydrogen atoms are on terminal silicon atoms for linear siloxane compounds. It is preferred that R^4 denotes a lower alkyl group having no more than 3 carbon atoms, most preferably a methyl group. R^3 preferably denotes an R^4 group. Preferably p = 0 and q has a value of from 2 to 70, more preferably 2 to 30, or where cyclic organosilicon materials are used, from 3 to 8. It is most preferred that the organosilicon crosslinker is a siloxane polymer having a viscosity of from 1 to 150 mm^2/s at 25°C, more preferably 2 to 100 mm^2/s, most preferably 5 to 60 mm^2/s. The cross-linking organosilicon compound may comprise a mixture of several materials as described.

Examples of suitable organosilicon cross-linkers are trimethylsiloxane end-blocked polymethylhydrosiloxane having up to for example 20 carbon atoms, dimethylhydrosiloxane end-blocked methylhydro siloxane, dimethylsiloxane methylhydrosiloxane copolymer and tetramethylcyclotetrasiloxane. The size of the organosilicon crosslinker is not crucial, but preferred are short chain organosiloxane polymers having at least three silicon-bonded hydrogen atoms, which have a chain length of from 2 to 50 silicon atoms, more preferably from 5 to 20. The amount of crosslinker used is preferred to allow a ratio of number of silicon-bonded hydrogen atoms to aliphatically unsaturated hydrocarbon and hydrocarbonoxy groups in the

elastomer-forming composition, which is at least 5/1, preferably from 5/1 to 10/1, most preferably 6/1 to 8/1.

In addition to the organopolysiloxanes and the organosilicon cross-linking compounds, the elastomer-forming compositions according the invention preferably also comprise a suitable catalyst, selected from those based on precious metals, particularly Group VIII metals, including ruthenium, rhodium, palladium, osmium, iridium and platinum. Preferably the catalyst is a well-known platinum compound or complex. Suitable platinum compounds and complexes include chloroplatinic acid, platinum acetylacetonate, complexes of platinous halides with unsaturated compounds such as ethylene, propylene, organovinylsiloxanes, and styrene, hexamethyldiplatinum, $PtCl_2$, $PtCl_3$, $PtCl_4$, and $Pt(CN)_3$. The preferred platinum catalyst is a form of chloroplatinic acid, either as the commonly available hexa-hydrate form or in its anhydrous form, as taught in US patent 2,823,218. Another particularly useful catalyst is the composition that is obtained when chloroplatinic acid is reacted with an aliphatically unsaturated organosilicon compound such as divinyltetramethyl-disiloxane, as disclosed in US patent 3,419,593. It is preferred that the catalyst is employed in an amount giving from 2 to 100 ppm by weight of platinum metal based on the total weight of the total composition, more preferably 5 to 50ppm.

Another essential ingredient in the elastomer-forming coating composition according to the invention is a reinforcing filler. Suitable fillers include silica, e.g. fumed silica, precipitated silica, gel-formation silica, aerosils, titania and glass microspheres. Preferably the filler has a hydrophobic surface, which may be obtained by treating the filler, e.g. with suitable silanes, short chain siloxanes, fatty acids or resinous silicone materials. Suitable materials and processes for rendering the surface

of fillers hydrophobic have been described in the literature, and are known to the person skilled in the art. The amount of reinforcing filler is again not crucial, but preferably from 10 to 50% by weight of the total elastomer forming composition consists of the filler, more preferably from 15 to 40%, most preferably 20 to 30%.

Other additional components may be included in suitable elastomer-forming compositions, including other fillers, chain extenders, dyes, adhesion promoters, colorants, pigments, viscosity modifiers, bath-life extenders, inhibitors and flexibilisers. Suitable other fillers include ground quartz, ground cured silicone rubber particles and calcium carbonate. Preferably these fillers have been treated to make their surface hydrophobic where necessary as described above. Adhesion promoters include epoxy-functional, organotitanates or amino-functional organosilicon compounds. Chain extenders are preferably not used, but where they are used, they tend to be organosiloxane materials which are predominantly linear in nature and which have a silicon-bonded hydrogen at each end of the polymer, allowing it to react with the R' group of siloxane polymers, this merely extending the length of the siloxane polymer.

The coating composition is preferably a composition which comprises

(a) 100 parts by weight of a first organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of from 50 to 650 mm^2/s;

(b) from 300 to 700 parts by weight of a second organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of at least 10,000 mm^2/s;

(c) from 50 to 150 parts by weight of a third organopolysiloxane material having has aliphatically unsaturated hydrocarbon substituents at terminal siloxane units and on units in the polymer chain per molecule;

(d) an organosilicon compound having at least three silicon-bonded hydrogen atoms per molecule, in an amount which is sufficient to give a molar ratio of Si-H groups in (d) to alkenyl groups in (a), (b) and (c) combined of from 5/1 to 10/1;

(e) a group VIII based catalyst component in sufficient amounts to catalyse the addition reaction between (a), (b) and (c) on the one hand and (d) on the other;

(e) from 100 to 400 parts by weight of a hydrophobic filler.

The elastomer-forming coating composition may be prepared by merely mixing the ingredients in the desired ratios. However, for reasons of storage stability and bath life before or during application of the compositions to the textile fabric, it is preferred to store the composition in two parts, by separating the catalyst (d) from the organosilicon cross-linker. The other components of the compositions are often distributed over both parts in proportions which will allow easy mixing of the two parts immediately prior to application. Such easy mixing ratios may be e.g. 1/10 or 1/1 ratios.

The invention includes a process for coating textile fabric with a layer of an elastomer-forming coating composition according to the invention and causing the layer to cure to form an elastomeric coating on the fabric. The invention also includes a coated fabric comprising a textile fabric coated with an elastomer-forming composition as described above cured to an elastomeric layer.

Suitable fabrics for use in the present invention may be made from synthetic fibres or blends of natural and synthetic fibres, and include polyester, polyimides,

polyethylene, polypropylene, polyester-cotton, glass fibre, most preferably polyamide fibres such as Nylon 6,6. They are preferably woven fabrics. They are required to be flexible in order to be useful as inflatable bodies. Preferably they are sufficiently flexible to be able to be folded into relatively small volumes, but also sufficiently strong to withstand their deployment at high speed, e.g. under the influence of an explosive charge, the impact of passengers or to be resistant to other influences when inflated.

The elastomer forming coating compositions may be applied according to known techniques to the textile fabric substrates. These include spraying, gravure coating, bar coating, coating by knife-over-roller, coating by knife-over-air, padding and screen-printing. It is preferred that the composition is applied by a knife-over-air or knife-over-roller coating method. It is also preferred that the composition is applied to a coat-weight prior to curing of at least 25 g/m^2. Preferably the coating thickness is from 25 to 150g/m^2, more preferably 60 to 130g/m^2 for applications where pressure needs to be maintained longer, e.g. in side curtain airbags, or 30 to 50 g/m^2 for applications where the pressure retention is not so critical over prolonged periods, e.g. in standard driver airbags. In order to make the compositions easily applicable to the textile fabric, it is preferred that the viscosity of the composition is from 50,000 to 200,000 mm^2/s. The textile fabric is preferably scoured prior to application, in order to ensure good adhesion of the composition.

Although it is not preferred, it is possible to apply the composition in multiple layers, which together fulfil the preferred criteria set out above. It is also possible to apply onto the coating composition a further coating, e.g. of a material providing low friction, or an additional

textile fabric, whether woven or non-woven, to improve the strength and/or the feel of the fabric.

Curing conditions for the coating are preferably at elevated temperatures over a period which will vary depending on the actual temperature used, for example 120 to 200°C for a period of up to 5 minutes.

The advantage of the invention is that without having to combine multiple layers of coating on the surface of a textile fabric the fabric is still very able to form a barrier between areas of differing pressure. Particularly useful applications for textile fabrics coated according to the present invention are those applications where the fabric is formed into an envelope and pressure is applied inside the envelope, e.g. by introducing gas into the envelope and thus inflating it. Particularly useful applications include automotive airbags, emergency shoots on aeroplanes, hot air balloons. The most valuable use of fabrics according to the invention is in the production of side curtain airbags for automobiles, where the internal pressure of the envelope needs to be maintained for a relatively long period of time, e.g. from 1 to 5 seconds. A specific advantage of the invention is that the cured coating provides the combination of very high values of elongation at break and tear strength values, making the composition particularly suitable for use with inflatable devices. It was found that the elongation at break is on average at least 400% and tear strength at least 30kN/m.

The following examples, where parts and percentages are given in weight, unless otherwise stated and where viscosity is dynamic viscosity at 25°C, illustrate the invention.

Examples

A first composition (I) was prepared by mixing together 52 parts of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 55,000mm^2/s, 16 parts of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 450mm^2/s, 7 parts of an vinyldimethylsiloxane end-blocked polydimethyl, polymethylvinyl siloxane copolymer having a viscosity of about 350mm^2/s, 25 parts of a fumed silica which had its surface made hydrophobic and 0.002 parts by weight of a platinum based catalyst. Composition (I) had a viscosity of 130,000m^2/s.

A second composition (II) was prepared, containing 51 parts by weight of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of 55,000mm^2/s, 3 parts of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 450mm^2/s, 9 parts of an vinyldimethylsiloxane end-blocked polydimethyl, polymethylvinyl siloxane copolymer having a viscosity of about 350mm^2/s, 25 parts by weight of a fumed silica which had its surface made hydrophobic, 12 parts by weight of an methylhydrosiloxane dimethylsiloxane copolymer having trimethylsiloxane end-blocking units, at least 3 silicon-bonded hydrogen atoms per molecule and a viscosity of about 5mm^2/s. Composition (II) had a viscosity of 130,000mm^2/s.

A first comparative elastomer-forming composition (C1) was prepared by mixing together 70 parts of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 2,000mm^2/s, 30 parts of a fumed silica which had its surface made hydrophobic and 0.002 parts by weight of a platinum based catalyst. Composition (C1) had a viscosity of 100,000mm^2/s.

A second comparative composition (C2) was prepared, containing 64 parts by weight of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of 2,000mm^2/s, 26 parts by weight of a fumed silica which had its surface made hydrophobic, 4 parts by weight of an methylhydrosiloxane dimethylsiloxane copolymer having trimethylsiloxane end-blocking units, at least 3 silicon-bonded hydrogen atoms per molecule and a viscosity of about 5mm^2/s and 5 parts by weight of a dimethylsiloxane having dimethylhydrosiloxane and-blocking units and a viscosity of about 10 mm^2/s. Composition (C2) had a viscosity of 100,000mm^2/s.

A third comparative composition (C3) was prepared containing 64 parts of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 55,000mm^2/s, 25 parts of a fumed silica which had its surface made hydrophobic, 0.002 parts by weight of a platinum based catalyst, and 9 parts of a dimethylsiloxane methylvinylsiloxane copolymer having vinyldimethylsiloxane end-blocking units and a viscosity of about 350mm^2/s. Composition (C3) had a viscosity of 175,000mm^2/s.

A fourth comparative composition (C4) was prepared by mixing together 61 parts of an α,ω-vinyldimethylsiloxane end-blocked polydimethylsiloxane having a viscosity of about 55,000mm^2/s, 25 parts of a fumed silica which had its surface made hydrophobic, 3 parts by weight of an methylhydrogensiloxane dimethylsiloxane copolymer having trimethylsiloxane end-blocking units, at least 3 silicon-bonded hydrogen atoms per molecule and a viscosity of about 5mm^2/s and 9 parts of a dimethylsiloxane methylvinylsiloxane copolymer having vinyldimethylsiloxane end-blocking units and a viscosity of about 350mm^2/s. Composition (C4) had a viscosity of 175,000mm^2/s.

A fifth comparative composition (C5) was prepared by mixing 5 parts of a first composition comprising 64 parts of a 70/30 mixture of a dimethylvinylsiloxy-terminated polydimethylsiloxane and hydrophobic silica, 26 parts of ground quartz, 4 parts of calcium carbonate and a catalytic amount of a platinum based catalyst and 1 part of a second composition comprising 50 parts of a 70/30 mixture of a dimethylvinylsiloxy-terminated polydimethylsiloxane and hydrophobic silica, 46 parts of a dimethylsiloxane methylhydrogen siloxane copolymer having silicon-bonded hydrogen atoms on about 50% of the silicon atoms.

Example 1

A double layered polyamide fabric of 470 Dtex was made into A4 sized envelopes coated on both sides of the fabric by a knife over roller technique with a 50/50 elastomer-forming mixture of compositions (I) and (II) to a coat weight of 120g/m^2, followed by heating the coated fabric for 90 seconds at 150-170°C. After allowing the coated fabric to cool to room temperature, a coated fabric was obtained having a silicone-based coat.

The fabric was then inflated with air under explosive conditions to a pressure of 220 kPa. The pressure in the sealed envelope was then measured after 5 seconds and after 10 seconds. Details of the test results are given below in Table I. Also were measured tear strength and elongation at break of a self-supported film of the cured coating composition. Results are also given in Table 1.

Comparative Examples C1-C5

All examples were carried out according to the process of Example 1. Comparative Example CE1 used a 50/50 mixture of Comparative compositions C1 and C2; Test results are also given in Table I below.

Table I

Example	Residual pressure after 5 seconds	Residual pressure after 10 seconds	Tear Strength kN/m	Elongation at break
1	180 kPa	150 kPa	40	600%
CE1	140 kPa	70 kPa	15	600%
CE2	130 kPa	70 kPa	45	250%
CE3	110 kPa	50 kPa	10	150%

CLAIMS

1. A coating composition for textile fabrics, which is curable to an elastomeric finish, which comprises a first, second and third organopolysiloxane having aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents, an organosilicon crosslinker having at least 3 silicon-bonded hydrogen atoms, a catalyst able to promote the reaction of the aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents with Si-H groups and a reinforcing filler, wherein the first and second organopolysiloxanes have aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents only at the terminal siloxane units, the first organopolysiloxane having a viscosity at 25°C of from 50 to 650 mm^2/s, the second organopolysiloxane having a viscosity at 25°C of at least 10,000 mm^2/s and wherein the third organopolysiloxane has aliphatically unsaturated hydrocarbon or hydrocarbonoxy substituents at terminal siloxane units and on siloxane units in the siloxane polymer chain.

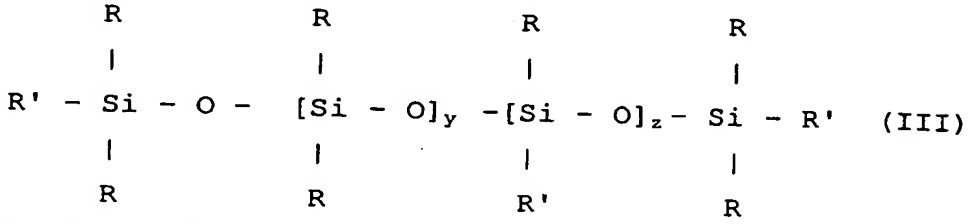
2. A coating composition according to Claim 1 or 2, wherein the first and second organosiloxane polymers are of a generally linear nature having the general structure (II)

$$R' - \underset{\underset{R}{|}}{\overset{\overset{R}{|}}{Si}} - O - \left[\underset{\underset{R}{|}}{\overset{\overset{R}{|}}{Si}} - O\right]_x - \underset{\underset{R}{|}}{\overset{\overset{R}{|}}{Si}} - R' \quad (II)$$

wherein R is a monovalent hydrocarbon group having up to 18 carbon atoms and R' is a monovalent hydrocarbon or hydrocarbonoxy group having aliphatic unsaturation and wherein x is an integer with a value of up to 200 for the first organopolysiloxane and having a value of at least 300 for the second organopolysiloxane.

3. A coating composition according to Claim 1 or Claim 2, wherein the first organopolysiloxane is an α,ω-vinyldimethylsiloxy polydimethylsiloxane polymer having a viscosity of from 50 to 650 mm^2/s at 25°C, and wherein the second organopolysiloxane is an α,ω-vinyldimethylsiloxy polydimethylsiloxane polymer having a viscosity of from 10,000 to 90,000 mm^2/s at 25°C.

4. A coating composition according to any of Claims 1 to 3, wherein the third organosiloxane polymer is of a generally linear nature having the general structure (III)

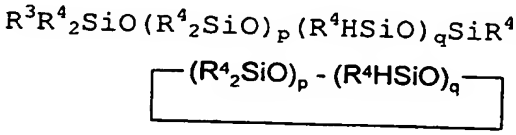


(III)

wherein R and R' have the same meaning as above, and wherein *y* is zero or an integer and *z* has a value of at least 1, while the value of *y+z* is no more than 300.

5. A coating composition according to any of Claims 1 to 4, wherein the first and second organopolysiloxane are present in a weight ratio of from 1 to 2 to 1 to 20, the second and third organopolysiloxanes in a weight ratio of from 20 to 1 to 2 to 1.

6. A coating composition according to any of Claims 1 to 5, wherein the organosilicon cross-linker has the general formula



or

wherein R^4 denotes an alkyl or aryl group having up to 10 carbon atoms, R^3 is a group R^4 or a hydrogen atom, p has a value of from 0 to 20, q has a value of from 1 to 70, and there are at least 3 silicon-bonded hydrogen atoms present per molecule.

7. A coating composition according to any of Claims 1 to 6, which further comprises a catalyst based on a Group VIII metal selected from ruthenium, rhodium, palladium, osmium, iridium and platinum.

8. A coating composition according to Claim 7, wherein the catalyst is selected from chloroplatinic acid, platinum acetylacetonate and complexes of platinous halides with unsaturated compounds.

9. A coating composition according to any of Claims 1 to 8, wherein the reinforcing filler is selected from silica, titania and glass microspheres.

10. A coating composition according to any of Claims 1 to 9, comprising (a) 100 parts by weight of a first organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of from 50 to 650 mm^2/s; (b) from 300 to 700 parts by weight of a second organopolysiloxane material having only terminal silicon-bonded aliphatically unsaturated hydrocarbon groups per molecule and a viscosity at 25°C of at least 10,000 mm^2/s; (c) from 50 to 150 parts by weight of a third organopolysiloxane material having has aliphatically unsaturated hydrocarbon substituents at terminal siloxane units and on units in the polymer chain per molecule; (d) an organosilicon compound having at least three silicon-bonded hydrogen atoms per molecule, in an amount which is

sufficient to give a molar ratio of Si-H groups in (d) to alkenyl groups in (a), (b) and (c) combined of from 5/1 to 10/1; (e) a group VIII based catalyst component in sufficient amounts to catalyse the addition reaction between (a), (b) and (c) on the one hand and (d) on the other; (e) from 100 to 400 parts by weight of a hydrophobic filler.

11. A coated fabric comprising a textile fabric coated with an elastomer-forming composition according to any of the preceding claims cured to an elastomeric layer.

12. A coated fabric according to Claim 11 wherein the elastomeric layer has an elongation of above 400% and a tear strength of over 30 kN/m.

13. A process for making a coated fabric, which comprises coating a textile fabric with a layer of an elastomer-forming coating composition according to any of Claims 1 to 10 and causing the layer to cure to form an elastomeric coating on the fabric.

14. A process according to Claim 13, wherein the composition is applied to a coat-weight prior to curing of at least 25 g/m^2.

15. A process according to Claim 13 or Claim 14, wherein the composition is cured at a temperature of from 120 to 200°C for a period of up to 5 minutes.

INTERNATIONAL SEARCH REPO

Internat ial Application No
PCT/EP 00/07675

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 D06N3/12 C09D183/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 D06N C09D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 866 164 A (DOW CORNING) 23 September 1998 (1998-09-23) cited in the application example 1	1-15
A	EP 0 771 901 A (RHONE-POULENC) 7 May 1997 (1997-05-07) column 6, line 12 - line 19; example 1	1
A	EP 0 150 385 A (GENERAL ELECTRIC) 7 August 1985 (1985-08-07) claim 13	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
7 November 2000	14/11/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Lentz, J

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

...ormation on patent family members

Internal Application No
PCT/EP 00/07675

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 866164 A	23-09-1998	BR 9800917 A	08-09-1999
		CN 1210170 A	10-03-1999
		JP 11001876 A	06-01-1999
EP 771901 A	07-05-1997	FR 2740479 A	30-04-1997
EP 150385 A	07-08-1985	US 4618522 A	21-10-1986
		AU 3464584 A	27-06-1985
		CA 1256338 A	27-06-1989
		DE 3484277 D	18-04-1991
		JP 3072754 B	19-11-1991
		JP 60167977 A	31-08-1985
		JP 2300386 A	12-12-1990
		JP 3075667 B	02-12-1991